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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/954,500	09/17/2001	Nicholas F. Borrelli	Borrelli 83 A	8916

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EXAMINER	
THORNTON, YVETTE C	
ART UNIT	**PAPER NUMBER**
1752	

DATE MAILED: 12/02/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/954,500	BORRELLI ET AL.	
	Examiner	Art Unit	
	Yvette C. Thornton	1752	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 7/23/03.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-23,42 and 52-59 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-23,42 and 52-59 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 1/11/02 is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13)☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) ☐ The translation of the foreign language provisional application has been received.

14)☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s). 1/8/02 3/10/03 3/12/03
4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

DETAILED ACTION

This is written in reference to application number 09/954500 filed on September 17, 2001 and published as US 2002/0076655 A1 on June 20, 2002, which is a CIP of 09/627868 now abandoned.

Information Disclosure Statement

1. The Information Disclosure Statement filed on January 8, 2002 is missing page 2 of 4.

2. The Information Disclosure Statements filed on March 10 and 12, 2002 have been entered and fully considered.

3. The examiner was unable to obtain a copy of A. Nakajima, "Glass emerges as data-storage contender". Science & Technology.

Election/Restrictions

4. Applicant's election without traverse of claims 1-23, 42 and 52-59 in Paper No. 07282003 is acknowledged.

5. Claims 24-41 and 43-51 have been cancelled.

Drawings

6. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference sign(s) not mentioned in the description: The drawings submitted on January 11, 2002 introduces a set of figures 1-11, which are different than those submitted on September 17, 2001. The drawings of January 11, 2002 are not disclosed or described in the present specification. A proposed drawing correction, corrected drawings, or amendment to the specification, are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

7. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter, which the applicant regards as his invention.

8. Claim 55 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. It is unclear to the examiner if claim 55 depends from claim 54 or claim 53. Correction is requested.

Claim Rejections - 35 USC § 102

9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

10. Claims 1-4, 15-17, 42 and 52 are rejected under 35 U.S.C. 102(e) as being anticipated by Miura (US 5978538 A) with applicant's own disclosure and information from the Corning website (www.hpfs.corning.com) cited to show inherent properties. Miura teaches an optical device including a glass in which refractive index changed region serving as an optical waveguide is formed in a continued state by laser beam irradiation. The glass is selected from the group consisting of oxide glass, halide glass, sulfide glass and chalcogenide glass. The light induced effect has been researched so far using an excimer laser such as an

UV laser. The laser beam has a repetition rate of 10KHz or higher to be useful for the formation of an optical waveguide. The light induced effect on the refractive index is assured by applying the laser beam with a peak power density of 10^5 W/cm^2 or more to a glass, which exhibits weak absorbance (c. 3, l. 15-27). When the glass is continuously scanned with the laser beam, a refractive index changed region is continuously formed along the locus of the focal point due to the higher repetition rate. The refractive index changed region is used as an optical waveguide since its refractive index is higher than the original refractive index of the glass (c 3, l. 28-36). The pulse duration should be short in order to form a smooth waveguide. Specifically, the repetition rate should be 10KHz or higher, preferably 100 KHz or more. The glass is continuously irradiated by decreasing the motion speed of the glass or the scanning speed of the focal point. The diameter of the waveguide is controlled by the power of the pulse laser, the diameter of the focal point and the like. Example 1 exemplifies a silicate glass composition which is irradiated with a pulsed laser beam of 800 nm emitted from a Ti:Al2O3 laser excited with an Ar laser beam and then focused by a condenser lens. The beam was focused in a manner such that a focal point was located within the interior of the sample. After being irradiated, the refractive index of the sample was 0.02 higher at the focal point. The change was reached in a very short time period such as on the order of ns or ps. It is the examiner's position that a ns or ps is less than 150 fs as set forth in instant claim 52. A straight high-refractive index region, useful as an optical waveguide was formed by the continuous motion of the glass sample or by the continuous scanning with the focused laser beam. It is the examiner's position that the taught continuous motion can be either perpendicular to the laser beam or parallel to the laser beam as shown in Figures 1 and 3.

Miura teaches that an optical device obtained by the taught method has the structure that optical waveguides can be formed with complicated three-dimensional patterns useful for discrete optical circuits (c. 6, l. 2-5). Ge-doped silicate glass was used in example 1, however Miura teaches that when other glasses such as high purity silicate, phosphate, borate, fluorate, chlorate and sulfate glasses were irradiated with a laser beam in the same way, a similar optical waveguide was formed in the glass (c. 4, l. 10-46). It is the examiner's position that a high purity silica would inherently meet the limitation of having an annealing temperature of less than 1350 or 1325 K as set forth in instant claims 2 and 3. This position is based on applicant's own disclosure on page 8, lines 25-29 of the specification, which teaches that suitable material, include undoped fused silica. The said position is further supported by information obtained from the Corning website (www.hpfs.corning.com) which gives the annealing temperature of its industrial grade fused silica to be 1042 °C (1315K).

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

12. Claims 5-7, 9-14, 18-20, and 53-59 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miura (US 5978538 A) with applicant's own disclosure and information from the Corning website (www.hpfs.corning.com) cited to show inherent properties as applied to claims 1-4, 15-17, 42 and 52 above.

Miura, as discussed above, teaches that the pulse duration, pulse energy, repetition rate, diameter and peak intensity are all result effective variables. Specifically, Miura teaches that the pulse duration should be shorter and the repetition rate should be increase so as to apply the first and second pulses in the shortest possible time and to obtain a smooth waveguide (c. 3, l. 37-45). Miura further teaches that the diameter of the waveguide is controlled by the power of the pulsed laser beam. The diameter of the waveguide can be increased by increasing the power of the pulsed laser or by increasing the diameter of the focal point. The rate of the refractive index change can be controlled by the repetition of scanning (c. 3, l. 64-c. 4, l. 5). Therefore, one of ordinary skill in the art would have been motivated by the teachings of Miura to modify the peak power density, repetition rate, pulse duration and diameter of the optical waveguide in order to optimize the properties of the formed waveguide.

13. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Miura (US 5978538 A) in view of applicant's own disclosure and information from the Corning website (www.hpfs.corning.com) as applied to claims 1-7, 9-20, 42 and 52-59 above, and further in view of Maxwell (US 5841928 A). Miura, as discussed above, teaches that when glasses such as high purity silicate, phosphate, borate, fluorate, chlorate and sulfate glasses were irradiated with a laser beam in the same way as the Ge-doped glass of example 1, a similar optical waveguide was formed in the glass (c. 4, l. 10-46).

Maxwell teaches the use of a glass composition comprising silica doped with oxide of Ge and B to make a planar waveguide. Maxwell teaches that the mole ratio of B:Ge is selected to control the refractive index of the glass prior to exposure. When the glass is

exposed the refractive index rises to produce path regions, which are surrounded by confining regions as in conventional waveguide technology (c. 3, l. 39-54). Maxwell further teaches that the presence of B tends to reduce the melting point of the silica (c. 6, l. 2-5), which would inherently reduce the annealing point of the Ge-doped silica. One of ordinary skill in the art would have been motivated by the teachings of Maxwell to introduce a second dopant such as boron (B) into the exemplified Ge-doped silica composition in order to control the refractive index of the glass prior to exposure.

14. Claims 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Miura (US 5978538 A) in view of applicant's own disclosure and information from the Corning website (www.hpfs.corning.com) as applied to claims 1-7, 9-20, 42 and 52-59 above, and further in view of Kersten (US 4145457 A). Miura teaches the formation of an optical waveguide by the taught process. It is well known and conventional in the art that waveguides are used to form directional couplers and various products as set forth in instant claim 21. This position is supported by the teachings of Kersten which states that directional couplers with waveguides arranged within a substrate are known in the art (c. 1, l. 14-17). It would have been obvious to one of ordinary skill in the art to use the waveguide obtained by Miura to make a directional coupler as taught by Kersten as it is well known and conventional in the art.

15. Claims 22-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miura (US 5978538 A) in view of applicant's own disclosure and information from the Corning website (www.hpfs.corning.com) as applied to claims 1-7, 9-20, 42 and 52-59 above, and further in view of Ainslie et al. (US 6075625 A). Miura teaches the formation of an optical

waveguide by the taught process. It is well known in the art that waveguides are conventionally used to make diffraction gratings. This position is supported by the teachings of Ainslie, which teaches that reflection gratings are often implemented as waveguides, which have a path region and/or a confining region with a modulated refracted index (c. 1, l. 3-5). It would have been obvious to one of ordinary skill in the art to use the waveguide obtained by Miura to make a diffraction grating, which may be used to store information as taught by Ainslie.

Conclusion

16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Yvette C. Thornton whose telephone number is 703-305-0589. The examiner can normally be reached on Monday-Thursday 8-6:30.

17. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark F. Huff can be reached on 703-308-2464. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

18. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-1495.

Yvette Clarke Thornton
Junior Examiner
Art Unit 1752

yct
November 23, 2003